

SOME NEW AND CRITICAL *PANDANUS* SPECIES OF SUBGENUS *ACROSTIGMA*

I*. Supplement to Revisio Pandanacearum

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Abstract

Eight species of *Pandanus* subgen. *Acrostigma* are discussed in this supplement. Seven of them are additions:— four have recently been published, two more are proposed as new herein and one has been omitted. *P. ellipsoideus* was poorly known and is here given a fuller description based on a recent collection. Both new species pertain to sect. *Acrostigma* subsect. *Dimissistyli*; one (*P. gladiator*) is from Sulawesi, the other (*P. jacobsii*) is from Papua New Guinea. As is usually the case, most of these species are as yet not represented by staminate specimens (known only in *P. merrillii*). Only one, *P. microglottis*, presents features which suggest a possible addition to the infrageneric scheme, but in the absence of sufficient specimens no change is suggested for the present.

Introduction

A synopsis, based on a critical revision, of two of the eight subgenera of *Pandanus*, subgen. *Acrostigma* and subgen. *Coronata*, was issued recently (Stone, 1978). That study, forming a component of the preliminary work leading to the revision of the family and to a family treatment in the Flora Malesiana, recognized three species in subgen. *Coronata* and 66 species in subgen. *Acrostigma*. Since then, a few additional species have been recognized, either as new or newly understood taxa from among the synonyms or *nomina dubia*. In this paper, these additions are listed in the same order of sections, subsections, and taxonomic order as was followed in the publication cited.

PANDANUS subgen. **ACROSTIGMA** (Kurz) Stone Sect. *Acrostigma* Kurz

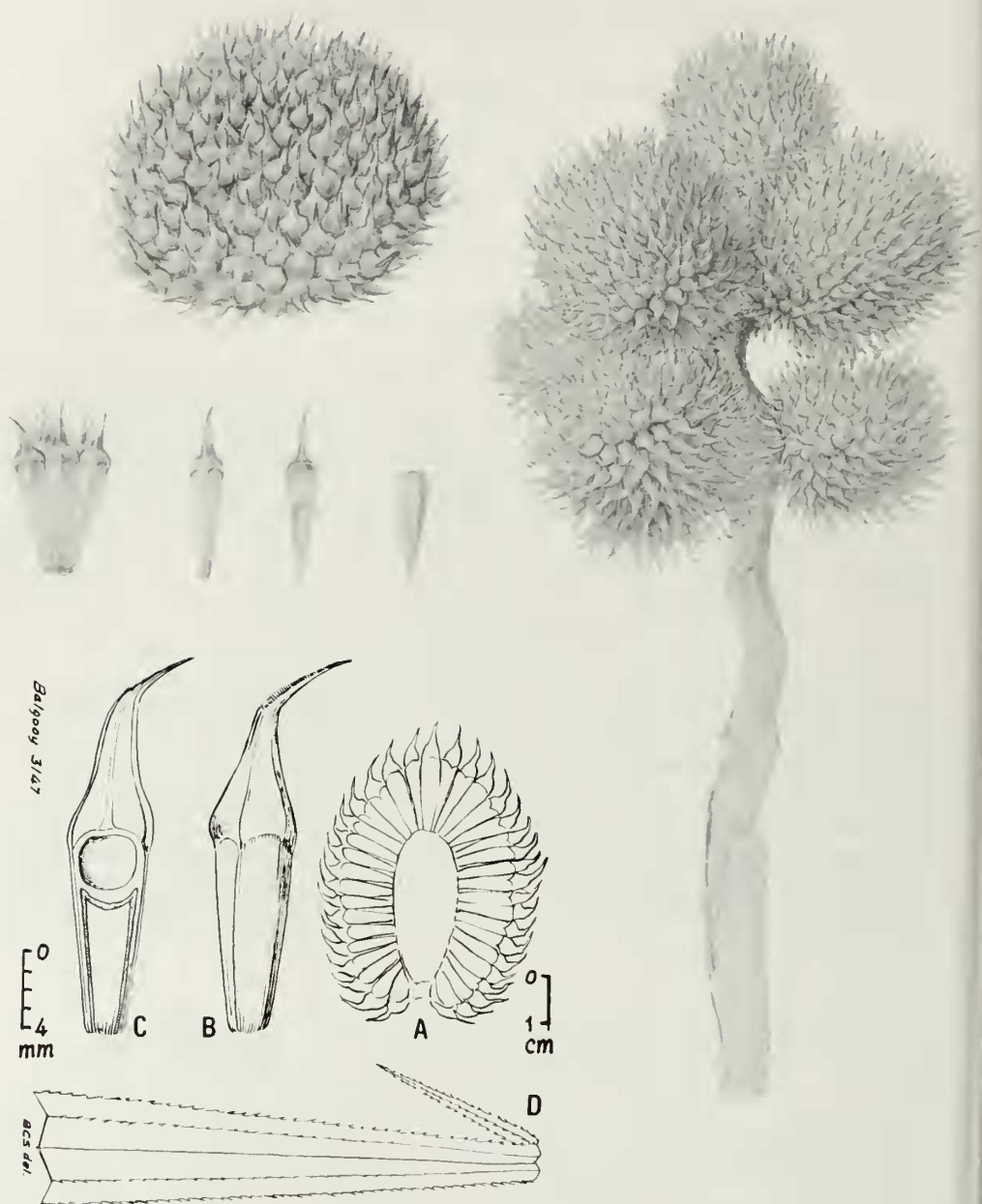
SUBSECT. *Acrostigma*

Pandanus ellipsoideus Warburg, Pflanzenr. 3 (1900) 81. Martelli, Webbia 4 (1913) 13, 4 (1914) t. 31, f. 19–20. Stone, Fedn. Mus. J. n.s. 23 (1978) 15. Fig. 1.

SULAWESI: Sopo valley, west slope, Roroka Timbu, ridge forest at 1200 m. alt., clay soil; short-stemmed stooling herb, inflorescence erect, fruit green, leaves used for making mats (tikar), 4 May 1979, *M. J. van Balgooy* 3147 (L).

Extended description: short-stemmed, stooling herb. Leaves linear, c. 120 cm long

* This paper is dedicated to the late Marius Jacobs of the Rijksherbarium, Leiden, in memory of his contributions to Malesian botany and his ungrudging help and assistance.



Below left: Fig. 1. *Pandanus ellipsoideus* Warb. — A: cephalium. 1.s.; B & C: drupe, B: profile and C: l.s., note the chamber above the endocarp in C; D: leaf apex, adaxial surface. All from Balgooy 3147 (L).

Above left: Fig. 2. *Pandanus merrillii* Martelli — Cephalium (upper) $\pm \times 1$; and drupes (lower) $\pm \times 1$; from the type collection, Merrill 840 (Fl). (Courtesy of Dr. C. Steinberg).

Right: Fig. 3. *Pandanus merrillii* — Inflorescence with cephalia, $\pm \times 2/3$; from Bermejós BS 232 (Fl). (Courtesy of Dr. C. Steinberg).

(or more), 3.8 cm wide, the apex gradually acuminate; lower surface glaucous; upper surface finely striolate, indistinctly cross-nerved toward apex; lower surface with fine, close longitudinal nerves (c. 84–86 per leaf), very slightly indistinctly raised, intervein areas densely stomatophorous. Leaf margins near base with spreading slender prickles c. 2 mm long, usually 3–5 mm apart; near middle, the prickles shorter, more appressed, c. 1 mm long, 3–6 mm apart; near apex, the prickles still smaller, c. 0.5 mm long, 1–2 mm apart. Beneath, midrib near base with short erect or retrorse prickles at least 1 mm long (or reduced and nut-like on scale leaves and lower bracts), often 3–4 mm apart but rather irregularly spaced; near middle, the midrib carinate, with antrorse prickles c. 1 mm long, 4–10 mm apart; near apex, with prickles similar in size and spacing to those on adjacent margins. Apical ventral pleats prickly along distal 30–33 cm with numerous small antrorse prickles c. 0.5–0.7 mm long, nearer the apex mostly 1.5–4 mm apart. *Inflorescence* erect, the pistillate peduncle to 50 cm long, 8 mm wide, triquetrous, glabrous, bracteate, distally zig-zag-helical, bearing 5 to 7 smallish ellipsoid cephalia c. 6 cm long, 5 cm wide, composed of numerous drupes, these with projecting, sharp, straight or slightly curved styles. Drupes 15–20 mm long (including style), c. 5 mm wide, the corpus clavoid, mostly 11–13 mm long, the pileus 5–6-angled, steeply pyramidal, gradually and rather indistinguishably produced upward as the sharp spiniform style, this erect or only slightly antrorsely curved, sharp, to 9 mm long; stigma linear, grooved, papillose, almost reaching the style tip. Apical mesocarp chamber large, rounded, c. 4 mm long; lower mesocarp very short fibrous; endocarp pale, c. 6 mm long, apex concave, base tapered, walls c. 0.5–0.6 mm thick.

In its inflorescences, leaves, and fruits, this species very much resembles *P. affinis* Kurz, a freshwater swamp lowland species common in Western Malesia, but in habit (as noted above) and certainly in habitat, this species appears quite different. The drupes of the cited specimens are an excellent match for those illustrated by Martelli.

Pandanus ketele B. C. Stone, J. Arn. Arb. 64 (1983) 312.

A slender upland swamp species of Papua New Guinea, belonging to the group of species including *P. adinobotrys* Merr. & Perry.

PAPUA NEW GUINEA: Southern Highlands Prov., Tari valley, Itipu village, 5600 ft. alt., 6 Sept. 1981, B. C. Stone & C. Rose 15005 (holotype, KLU; isotypes, BISH, LAE).

A shrub similar to *P. adinobotrys* but more slender and smaller in all respects except the longer pistillate peduncles.

Pandanus lustrorum B. C. Stone, J. Arn. Arb. 64: (1983) 313.

This recently described Papuan species is an addition to the small cluster of species centering around *P. adinobotrys* Merr. & Perry.

PAPUA NEW GUINEA: West Sepik Distr., Telefomin, alt. 1800 m, wet swamp,

erect pandan to 3 m tall, with many short side branches, leaves grey, fruit pale orange-brown solitary, Mar. 1975, *Womersley & Waikabu NGF 48718* (holotype, KLU: isotypes, LAE, L, BRI).

Pandanus merrillii Warburg, in Perkins, *Fragm. Pl. Philipp.* 50. 1904. Martelli, *Philipp. J. Sci. Bot.* 3 (1908) 71. Martelli, *Webbia* 4 (1913) 23, 4 (1914) t. 35-37. Merrill, *Enum. Philipp. Fl. Pl.* 1 (1925) 19. Figs. 2, 3.

PHILIPPINES: Palawan; Paragua Island, San Antonio Bay, alt. 1500 ft., on dry slopes, Feb. 1903, *E. D. Merrill 840* (isotypes FI, NY).

Additional collections, all from Palawan; *Merrill 7250, 9274* (staminate), *9375*, and *Bermejos B.S. 232* (FI).

This species is so similar to *P. affinis* Kurz that, on the basis of herbarium material alone, discrimination is virtually impossible. The sole difference worthy of note seems to be the presence, albeit slight, of minute bristles on the pistillate peduncle, noticeable in the type collection. The slightly hispidulous peduncle is not, so far, known in *P. affinis*, but is found in *P. monticola* F.v.M. of Queensland, another (but quite different) species of sect. *Acrostigma*. Following are some supplementary descriptive notes on *P. merrilli* drawn from the isotypes.

Leaves linear attenuate acute, the apex somewhat prolonged, subflagellate, to 162 cm long (and over), 2.8 cm wide; base with sheath about 3.5 cm long; margins near base with spreading prickles with slightly recurved tips 2-2.8 mm long, 1.5-5 mm apart; near the middle, the marginal teeth slender antrorse, nearly 1 mm long, 3-6 mm apart; near apex, the teeth antrorse, 0.25 mm long, 1 mm apart. Midrib near base with stout broad-based retrorse prickles to nearly 3 mm long, 1.5-11 mm apart; farther out along basal fifth of leaf, the prickles recurved, 2 mm long, more remote, to 25 mm apart; near the middle, the teeth scarcely 1 mm long, antrorse, 10 mm apart; near apex, the teeth similar in size and spacing to those of the adjacent margin. Apical ventral pleats prickly with antrorse prickles scarcely 0.5-0.9 mm long, irregularly spaced, sometimes only 1 mm apart, sometimes several cm apart, extending along the most distal 30 cm of the leaf. Undersurface pale glaucous. Longitudinal nerves about 67-69 per leaf, dorsally overlain by the minute punctiform stomatal complexes visible as 3-5 parallel rows of dots. Infructescence spicate, cephalia 5 (or more?) together, each c. 5.5 cm diameter, the drupes crowded. Penduncle slightly hispidulous toward apex, or not (?). Drupes c. 27 mm long (including styles), the corpus 15 mm long, 4-5 mm wide; pileus 3-4 mm long, produced into a style c. 6 mm long. Staminate inflorescence spicate; spike bearing apparently solitary stamens, each with a short filament 1 mm long and a long anther 8 mm long, the apiculus 0.5 mm long. (Staminate description based on *Merrill 9274*).

Pandanus microglottis B. C. Stone, *Bot. J. Linn. Soc.* 85 (1982) 34, f. 7.

This Sarawak species is noteworthy for its polycephalic infructescence and the

short, ovate-acute stigmas on similarly short, broad, non-spiniform styles. The latter feature suggests that the species has an isolated position in the section and may even deserve a subsectional rank on its own. However, pending the discovery of the staminate plants, this remains a potential status rather than a clearly deserved one, and for the time being, it is merely ranked as a species of subsection *Acrostigma*.

SARAWAK: Mulu National Park (4th Division), Sungei Melinau Paku drainage area along rocky riverbanks beside Transit Camp 2 at c. 150 m alt., 2 Apr. 1978, *Stone 13654* (holotype, KLU; isotypes, K, SAR).

SUBSECT. *Dimissistyli* Stone

***Pandanus gladiator* B. C. Stone, sp. nov.**

Fig. 4.

Frutex arborescens usque ad 5 m altus, erectus, sparsiter ramosus, strictus; solitarius; corona foliorum densa; *foliis* lineari-attenuatis coriaceis munitis, usque ad 300 cm longis, et 8 cm latis, apice acutis breviter subcaudatis; marginibus in basi dentatis, dentibus rigidis deltoideis patentibus c. 2.5 mm longis et 2–5 mm sese separatis; in medio, dentibus subappressiter curvatis antrorsis c. 2 mm longis, (3–) 5–9 (–12) mm sese separatis; apicem versus, denticulis parvioribus, subappressiter antrorse curvatis, klydoniformibus, densis, c. 1–1.4 mm longis et 1 mm sese separatis; *costa media* dorso in basi hamato-aculeato dentibus reflexis 3–3.5 mm longis, 3–12 mm sese separatis; in medio, denticulis subappressiter antrorsis parvioribus c. 1.4–1.8 mm longis, (2–) 4–8 (–11) mm sese separatis; apicem versus, denticulis antrorsis gracilibus c. 1–1.2 mm longis et 2–3 mm sese separatis; in cauda, denticulis ad eis in margine adjacenti simillimis; pagina infra ut videtur pallido et glauco, densiter et obscuriter venosostriatulo; plicibus apicalibus foliorum ventraliter denticulatis. *Inflorescentia* axillaris, spicata, robusta, bracteata (bracteis delapsis), polycephala (cephaliis c. 5–7); cephalis aggregatis, oblato-rotundis, lateraliter subcompressis, c. 9–10.5 cm longis, 10–11 cm latis, receptaculo c. 3–4 × 2.5 cm, drupis numerosis ferenti; pedunculo triquetro c. 40 cm longo, 2.5 cm crasso, robusto. *Drupa* (ex loco mediani) c. 40 mm longa; pileo (corpore styliforme) 25–30 mm longo (stylo incluso); pyrena basali anguste obovoidea 8.9–9.5 mm longa et 3 mm lata, vel (mesocarpio basali incluso) c. 11 mm longa; stylo (sensu stricto) spiniforme, antrorse curvato vel recto, 4–6 mm longo, acutissimo; stigmatibus anguste canaliculatis nigro, per totam longitudinem styli; endocarpio pallido pariete c. 0.5 mm crasso. Cetera ignota.

Type: SULAWESI (Celebes), Mt. Roroka Timbu, west slope, c. 80 km SSE. of Palu, disturbed lower montane forest c. 35 m high, with little undergrowth, on steep terrain with shallow clayey soil; solitary “schopfbaum” 5 m tall, fruit bright red; leaf c. 3 m long; trunk hardly branched; 11 May 1979; *E. F. de Vogel* 5287 holotype, BO!; isotypes, L! KLU!).

This species fits readily into subsect. *Dimissistyli*, but is the first species in that group to present a spicate, polycephalic infructescence, and this seems its principal distinctive character. However, drupe size is smaller than in *P. danielmannianus* K. Schum. and larger than in *P. misimaensis* St. John ex Stone; but about the same as in *P. erinaceus* Stone and *P. lictor* Stone. The long pilei of the drupe are relatively smooth, unlike the coarsely verruculose pilei of *P. verruculosus* Backer ex Stone.

The species is known so far only from the type collection.

The specific epithet is well known and means “sword-fighter” in allusion to the sword-like leaves; but also more broadly appropriate because of the various weapons which the Roman gladiators used, including the mace, to which the fruit-heads bear

a certain resemblance. The species is also a companion of *P. lictor*, the specific epithet of which means "mace-bearer."

Pandanus gladiator is the western-most of subsect. *Dimissistyli*, and probably indicates the absolute western boundary of this subsection. There is one other Moluccan species (*P. verruculosus*), from Halmaheira, but probably a few more remain to be found. Most of the species are in New Guinea, the Bismarck Archipelago, and the Solomon Islands.

Pandanus jacobsii B. C. Stone, **sp. nov.**

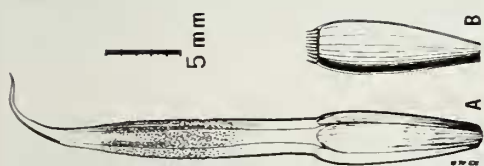
Fig 5.

Frutex usque ad 2-3 m altus, stipite ad 4 cm crasso, simplex; radicibus gralliformibus nullis. Folia linearia ad 220 cm longa, 5 cm lata, infra glauca, apicem versus acutata; marginibus in basi dentatis, dentibus c. 2 mm longis, 1-5 mm sese separatis; in medio, dentibus antrorsis, c. 1 mm longis, 1-5-4 mm sese separatis; apicem versus, denticulis subappressiter antrorsis c. 0.5-1 mm longis, c. 1.5 mm sese separatis. Costa media dorso in basi per spatio 15-18 cm inerme, deinde dentibus deltoideis patentoretrorsis ad 2.5 mm longis, 6-14 mm sese separatis; in medio, costa carinato, denticulis antrorsis 0.7-0.9 mm longis, 1-3 mm sese separatis; apicem versus, denticulis antrorsis 0.5-0.9 mm longis, 1-3 mm sese separatis. Plicae foliorum apicali-ventraliter armatae, denticulis antrorsis 0.75 mm longis, irregulariter separatis, sparsis. Inflorescentia axillaris, pedunculo c. 10 cm longo, 14 mm crasso (apicem versus); cephalio solitario oblato-globoso c. 10 × 11 cm, receptaculo c. 4 cm longo, drupis numerosis composito. Drupa c. 35 mm longa, pileo c. 20 × 4 mm anguloso, verruculoso-tuberculato, in stylo 6-7 mm longo antrorse curvato producto, stigmatibus lineare subaequilongis; pyreno 12-13 mm longo, 4-5 mm lato, endocarpio 10 mm longo, pariete pallido c. 0.14 mm crasso. Semen c. 8 mm longum. Cetera ignota.

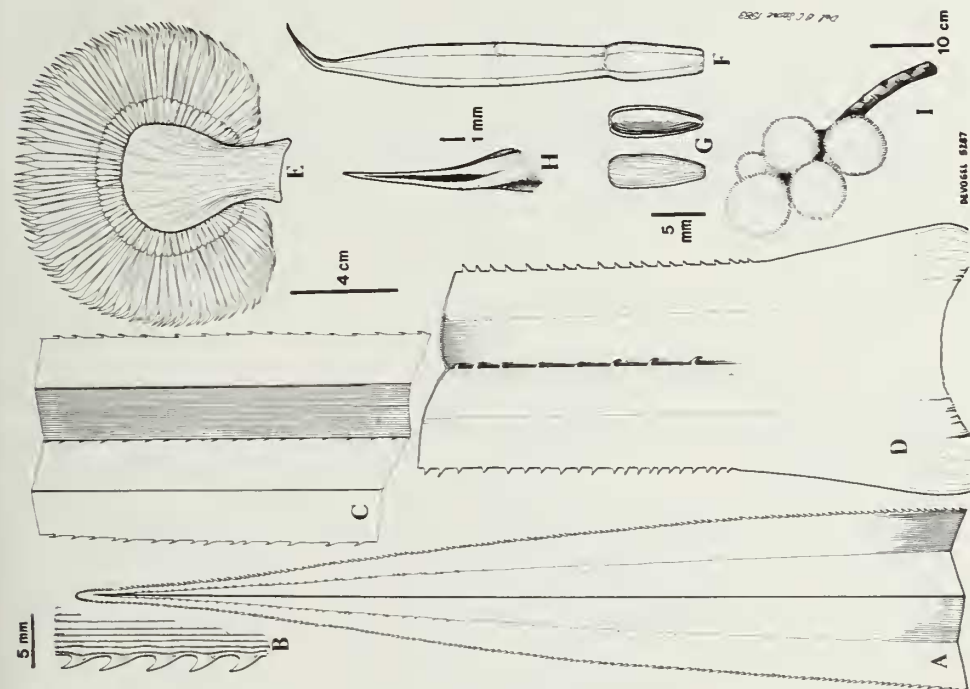
Type: PAPUA NEW GUINEA: Southern Highlands Prov., limestone country near Waro airstrip 20 km SSW of Kutubu, 6° 31' S, 143° 10' E, at 500-600 m alt., single-stemmed pandan without proproots, 2-3 m tall, leaves glaucous underneath, fruit light red, 15 Oct. 1973, *M. Jacobs 9281* (L holotype, 2 sheets!).

Like most species of subsect. *Dimissistyli*, *P. jacobsii* has the erect, not or little-branched trunk, with no or few basal proproots, an axillary inflorescence, the pistillate peduncle bearing a solitary oblate globose cephalium, and the drupes ripening red. In *P. jacobsii*, the drupes are quite small, approaching *P. misimaensis* St. John ex Stone, in their dimensions. However, the additional length and the more coarsely verruculose-tuberculate pilei distinguish *P. jacobsii*. The marginal prickles of the leaf apex are moreover smaller in *P. misimaensis*. *Pandanus verruculosus* Backer ex Stone has also the tuberculate pilei intimated by its name, but in this Halmaheiran species the cephalia are larger (12-15 cm diameter) and leaves much larger (to 500 × 14 cm). Perhaps the most similar species to *P. jacobsii* is *P. erinaceus* Stone, which however is a taller plant (to 5 m), with basal proproots to 1 m long, and the drupes have a virtually smooth pileus.

The new species is named after the late Dr. M. Jacobs of the Rijksherbarium, Leiden, in recognition not only of his merit in obtaining the type collection but for his botanical contributions to the Flora Malesiana and special assistance to the author.



Right: Fig. 5. *Pandanus jacobsonii* B. C. Stone sp. nov. — A: leaf apex, middle portion, abaxial surface; B: pyrene, l.s.; from the type collection Jacobs 9281 (L).



Left: Fig. 4. *Pandanus gladiator* B. C. Stone sp. nov. — A: leaf apex, adaxial surface; B: idem, detail of marginal prickles; C: leaf, middle portion, abaxial surface; D: leaf base, abaxial surface; E: cephalium, l.s.; F: drupe, profile; G: pyrene, profile and l.s.; H: detail of style & stigma and I: infructescence. All from the type collection, de Vogel 5287 (L).

SUBSECT. *Alticolae* Stone

Pandanus lepatophilus B. C. Stone, Bot. J. Linn. Soc. 85 (1982) 31, f. 6.

A remarkable, small, sprawling decumbent plant, probably a facultative epiphyte, known so far only from the massive limestone peak Gunung Api in Mulu National Park, Sarawak. The solitary cephalium is only 15 mm long (sometimes two occur together), but the size of the fruit at maturity is not known. At the unripe stage the drupes are only about 1 cm long.

SARAWAK: Mulu National Park (4th Division), Gunung Api limestone ridge at c. 1500 m alt., 14 Apr. 1978, *Argent & Jermy 973* (holotype, E; isotypes, K, KLU, SAR).

It should be mentioned that the type species of this subsection, *P. alticola* Holtt. & St. John, is also known from Sarawak and has in fact also been collected in Mulu National Park (*Ivan Nielsen 662*, in AAU).

Acknowledgement

My thanks are due to E. F. de Vogel for his kindness in showing me his collection of *Pandanus gladiator* before final processing at Leiden in 1981, and to the Rijksherbarium for making a duplicate available for study at KLU in 1983.

Literature Cited

Stone, B. C. (1978) *Revisio Pandanacearum*, Part I. *Pandanus* subgenera *Coronata* Martelli and *Acrostigma* (Kurz) Stone. *Flora Malesiana, Precursores. Fedn. Mus. J.* n.s. 23: 1-74, Plates I-VI.